

Microwave Active Circuit Analysis And Design

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Nonlinear Microwave Circuits - Stephen A. Maas 1997

This classic text is an excellent resource and time-saver for engineers who need to tackle troublesome nonlinear components that remain in use despite recent advances in microwave technology. NONLINEAR MICROWAVE CIRCUITS offers detailed, technically substantial coverage of key methods for the analysis, design, and optimization of nonlinear microwave circuits. Using minimal mathematics, it integrates in-depth, "readable" coverage of the underlying theories that guide these methods. This book is replete with valuable "how to" information on a wide range of topics.

Passive and Active RF-Microwave Circuits - Pierre Jarry 2015-04-02

Microwave and radiofrequency (RF) circuits play an important role in communication systems. Due to the proliferation of radar, satellite, and mobile wireless systems, there is a need for design methods that can satisfy the ever increasing demand for accuracy, reliability, and fast development times. This book explores the principal elements for receiving and emitting signals between Earth stations, satellites, and RF (mobile phones) in four parts; the theory and realization of couplers, computation and realization of microwave and RF filters, amplifiers and microwave and RF oscillators. Passive and Active RF-Microwave Circuits provides basic knowledge for microwave and RF range; each chapter provides a complete analysis and modelling of the microwave structure used for emission or reception technology, providing the reader with a set of approaches to use for current and future RF and microwave circuits designs. Each chapter provides a complete analysis and modeling of the microwave structure used for emission or reception technology. Contains step-by-step summaries of each chapter with analysis, Provides numerous examples of problems with practical exercises

Nonlinear Active Microwave Circuits - T. Berceli 1987

This book presents analysis and design methods of microwave nonlinear active circuits. Nonlinear models are established for each individual device, thus introducing a set of nonlinear building blocks. This allows not only qualitative but also quantitative investigations. The relationships thereby obtained can be used for design purposes, and they are also a help in understanding the circuit operation and for the detailed investigation of oscillators, amplifiers, mixers, frequency multipliers and dividers. The book concentrates on problems arising from the active nonlinear elements, and it is mostly nonlinear transmission properties that are investigated. Normalized quantities are applied in order to obtain results that can be used generally for a wide range of applications. Equations are derived for many important circuit characteristics such as bandwidth, gain, amplitude and phase response, group delay time, AM compression, AM to PM conversion, noise figure, AM noise, FM noise, output power, added power,

efficiency, matching, optimum adjustment, stability, dynamic properties. The results are directly applicable in the design procedure of circuits.

RF and Microwave Circuit Design - Charles E. Free 2021-09-14

RF and Microwave Circuit Design Provides up-to-date coverage of the fundamentals of high-frequency microwave technology, written by two leading voices in the field RF and Microwave Circuit Design: Theory and Applications is an authoritative, highly practical introduction to basic RF and microwave circuits. With an emphasis on real-world examples, the text explains how distributed circuits using microstrip and other planar transmission lines can be designed and fabricated for use in modern high-frequency passive and active circuits and sub-systems. The authors provide clear and accurate guidance on each essential aspect of circuit design, from the theory of transmission lines to the passive and active circuits that form the basis of modern high-frequency circuits and sub-systems. Assuming a basic grasp of electronic concepts, the book is organized around first principles and includes an extensive set of worked examples to guide student readers with no prior grounding in the subject of high-frequency microwave technology. Throughout the text, detailed coverage of practical design using distributed circuits demonstrates the influence of modern fabrication processes. Filling a significant gap in literature by addressing RF and microwave circuit design with a central theme of planar distributed circuits, this textbook: Provides comprehensive discussion of the foundational concepts of RF and microwave transmission lines introduced through an exploration of wave propagation along a typical transmission line Describes fabrication processes for RF and microwave circuits, including etched, thick-film, and thin-film RF circuits Covers the Smith Chart and its application in circuit design, S-parameters, Mason's non-touching loop rule, transducer power gain, and stability Discusses the influence of noise in high-frequency circuits and low-noise amplifier design Features an introduction to the design of high-frequency planar antennas Contains supporting chapters on fabrication, circuit parameters, and measurements Includes access to a companion website with PowerPoint slides for instructors, as well as supplementary resources Perfect for senior undergraduate students and first-year graduate students in electrical engineering courses, RF and Microwave Circuit Design: Theory and Applications will also earn a place in the libraries of RF and microwave professionals looking for a useful reference to refresh their understanding of fundamental concepts in the field.

Noise in Linear and Nonlinear Circuits - Stephen A. Maas 2005

Overcome the effects of noise to push the level of circuit performance with this practical reference. Thoroughly explaining the theory of noise in high-frequency circuits, the book focuses on the real-world problems noise creates. It provides

you with a full understanding of methods for analyzing and minimizing noise in linear and nonlinear circuits. The book pays special attention to phase noise in oscillators, offering you a comprehensive and accessible treatment of this critical topic. Additionally, this authoritative volume examines noise in low-noise amplifiers, mixers, and frequency multipliers.

Microwave Active Circuit Analysis and Design - Clive Poole 2015-11-03

This book teaches the skills and knowledge required by today's RF and microwave engineer in a concise, structured and systematic way. Reflecting modern developments in the field, this book focuses on active circuit design covering the latest devices and design techniques. From electromagnetic and transmission line theory and S-parameters through to amplifier and oscillator design, techniques for low noise and broadband design; This book focuses on analysis and design including up to date material on MMIC design techniques. With this book you will: Learn the basics of RF and microwave circuit analysis and design, with an emphasis on active circuits, and become familiar with the operating principles of the most common active system building blocks such as amplifiers, oscillators and mixers Be able to design transistor-based amplifiers, oscillators and mixers by means of basic design methodologies Be able to apply established graphical design tools, such as the Smith chart and feedback mappings, to the design RF and microwave active circuits Acquire a set of basic design skills and useful tools that can be employed without recourse to complex computer aided design Structured in the form of modular chapters, each covering a specific topic in a concise form suitable for delivery in a single lecture Emphasis on clear explanation and a step-by-step approach that aims to help students to easily grasp complex concepts Contains tutorial questions and problems allowing readers to test their knowledge An accompanying website containing supporting material in the form of slides and software (MATLAB) listings Unique material on negative resistance oscillator design, noise analysis and three-port design techniques Covers the latest developments in microwave active circuit design with new approaches that are not covered elsewhere

Scattering Parameters in RF and Microwave Circuit Analysis and Design - Janusz A. Dobrowolski 2016-05-31

Based on the popular Artech House title Microwave Network Design Using the Scattering Matrix, this authoritative resource provides comprehensive coverage of the wave approach to microwave network characterization, analysis, and design using scattering parameters. New topics include signal and noise analysis of differential microwave networks based on mixed mode wave variables, generalized mixed mode scattering, and generalized mixed mode noise wave scattering matrix. This one of a kind resource presents all aspects and topics related to the scattering matrix which have been developed and applied in microwave theory and practice. The book is an excellent source of theoretical information on the wave variables and scattering matrix and their application to microwave network characterization, modeling, analysis and design. This book demonstrates the approach of noise and signal analysis and how it is applicable to two port networks and their cascades, multi-ports and multi-element multiport networks with standard single-ended ports with differential ports and simultaneously with single-ended and differential ports. It is suitable for beginners, and students as well as experienced engineers and researchers working in the field of microwaves. *RF and Microwave Transistor Oscillator Design* - Andrei Grebennikov 2007-04-30 The increase of consumer electronics and communications applications using Radio Frequency (RF) and microwave circuits has implications for oscillator design.

Applications working at higher frequencies and using novel technologies have led to a demand for more robust circuits with higher performance and functionality, but decreased costs, size and power consumption. As a result, there is also a need for more efficient oscillators. This book presents up to date information on all aspects of oscillator design, enabling a selection of the best oscillator topologies with optimized noise reduction and electrical performance. RF and Microwave Transistor Oscillator Design covers: analyses of non-linear circuit design methods including spectral-domain analysis, time-domain analysis and the quasilinear method; information on noise in oscillators including chapters on varactor and oscillator frequency tuning, CMOS voltage-controlled oscillators and wideband voltage-controlled oscillators; information on the stability of oscillations, with discussions on the stability of multi-resonant circuits and the phase plane method; optimized design and circuit techniques, beginning with the empirical and analytic design approaches, moving on to the high-efficiency design technique; general operation and design principles of oscillators, including a section on the historical aspects of oscillator configurations. A valuable reference for practising RF and Microwave designers and engineers, RF and Microwave Transistor Oscillator Design is also useful for lecturers, advanced students and research and design (R&D) personnel.

Microwave and RF Circuits - Max W. Medley 1993

Provides coverage of the most efficient and effective methods of network analysis optimization and synthesis. A step-by-step guide to every aspect of the RF and microwave circuit design process - starting with a set of specifications and ending with hardware that performs as modeled the first time.

Analysis and Design of Autonomous Microwave Circuits - Almudena Suarez 2009-01-14 Presents simulation techniques that substantially increase designers' control over the oscillation in autonomous circuits This book facilitates a sound understanding of the free-running oscillation mechanism, the start-up from the noise level, and the establishment of the steady-state oscillation. It deals with the operation principles and main characteristics of free-running and injection-locked oscillators, coupled oscillators, and parametric frequency dividers. Analysis and Design of Autonomous Microwave Circuits provides: An exploration of the main nonlinear-analysis methods, with emphasis on harmonic balance and envelope transient methods Techniques for the efficient simulation of the most common autonomous regimes A presentation and comparison of the main stability-analysis methods in the frequency domain A detailed examination of the instabilization mechanisms that delimit the operation bands of autonomous circuits Coverage of techniques used to eliminate common types of undesired behavior, such as spurious oscillations, hysteresis, and chaos A thorough presentation of the oscillator phase noise A comparison of the main methodologies of phase-noise analysis Techniques for autonomous circuit optimization, based on harmonic balance A consideration of different design objectives: presetting the oscillation frequency and output power, increasing efficiency, modifying the transient duration, and imposing operation bands Analysis and Design of Autonomous Microwave Circuits is a valuable resource for microwave designers, oscillator designers, and graduate students in RF microwave design.

Microwave Transmission Line Circuits - William T. Joines 2013-01-01

Here's an authoritative resource that offers you valuable assistance with your work involving microwave circuit analysis and design. This practical book provides a thorough understanding of the properties of planar transmission lines for integrated circuits. It presents matrix and computer-aided methods for analysis

and design of circuit components. You find in-depth details on input, output, and interstage networks, as well as coverage of stability, noise, and signal distortion. Moreover, this unique book is the first to explore and develop the interface between lumped-element circuits and distributed element circuits. Supported with over 580 equations and 100 illustrations, this volume presents the necessary technological underpinnings and all the practical details you need to fully comprehend and work with the material.

Introduction to Microwave Circuits - Robert J. Weber 2001-01-23

"Do you want to design a wireless transmitter or receiver for hand-held telephones? Have you wondered why the printed circuit wires on high-frequency circuits don't always run in a straight line? This valuable text will answer all of your questions regarding component parasitics and circuit characterization for rf/microwave amplifier, oscillator, and filter circuit design and analysis. You will understand why capacitors act as inductors and vice versa and why amplifiers work like oscillators, while oscillators for local area networks work more like local area heaters. Application of the information in Introduction to Microwave Circuits will reduce design-cycle time and costs, markedly increasing the probability of first-time success in printed circuit or monolithic microwave integrated circuit (MMIC) design. Several approaches are taken into consideration, such as the effects of currents on the ground plane, bypass and coupling capacitors, and nonlinear effects in linear circuits. Featured topics include: *

Incorporation of component parasitics in the design cycle * Closed form solution to oscillator design * Odd mode stability analysis * PIN diode analysis for high-power switching applications An integrated design example of a 1.25 GHz amplifier, oscillator, and filter printed circuit is also included, which could be useful in printed circuit board designs from tens of megahertz to tens of gigahertz. Introduction to Microwave Circuits provides the tools necessary to analyze or synthesize microwave circuits. This text is an essential reference for undergraduate students, microwave engineers, and administrators. Also, it will assist experienced designers in other fields to meet the current rapid expansion of communication system applications and work effectively in microwave circuit design. About the Author Robert J. Weber began his prolific career in the Solid State Research Laboratory at the Collins Radio Company, later a part of Rockwell International. For 25 years, he worked on advanced development and applied research in the one- to ten-gigahertz frequency range and received several distinguished awards for his valuable contributions to the field. Dr. Weber is involved in ongoing experimental research in integrating microwave circuits with other devices such as MEMS, chemical sensors, and electro-optics. Also, he teaches microwave circuit design and fiber-optics communications at the Department of Electrical and Computer Engineering, Iowa State University. Dr. Weber is an IEEE Fellow." Sponsored by: IEEE Microwave Theory and Techniques Society.

Nonlinear Microwave Circuit Design - Franco Giannini 2004-06-07

Design techniques for nonlinear microwave circuits are much less developed than for linear microwave circuits. Until now there has been no up-to-date text available in this area. Current titles in this field are considered outdated and tend to focus on analysis, failing to adequately address design and measurement aspects. Giannini and Leuzzi provide the theoretical background to non-linear microwave circuits before going on to discuss the practical design and measurement of non-linear circuits and components. Non-linear Microwave Circuit Design reviews all of the established analysis and characterisation techniques available and provides detailed coverage of key modelling methods. Practical examples are used

throughout the text to emphasise the design and application focus of the book. * Provides a unique, design-focused, coverage of non-linear microwave circuits * Covers the fundamental properties of nonlinear circuits and methods for device modelling * Outlines non-linear measurement techniques and characterisation of active devices * Reviews available design methodologies for non-linear power amplifiers and details advanced software modelling tools * Provides the first detailed treatment of non-linear frequency multipliers, mixers and oscillators * Focuses on the application potential of non-linear components Practicing engineers and circuit designers working in microwave and communications engineering and designing new applications, as well as senior undergraduates, graduate students and researchers in microwave and communications engineering and their libraries will find this a highly rewarding read.

Microwave Circuits - Vincent F. Fusco 1987

Fundamentals of RF and Microwave Circuit Design - Manou Ghanevati 2019-09-09

This is the second edition of the original book.

Radio Frequency and Microwave Electronics Illustrated - Matthew M. Radmanesh 2001
Foreword by Dr. Asad Madni, C. Eng., Fellow IEEE, Fellow IEE Learn the fundamentals of RF and microwave electronics visually, using many thoroughly tested, practical examples RF and microwave technology are essential throughout industry and to a world of new applications-in wireless communications, in Direct Broadcast TV, in Global Positioning System (GPS), in healthcare, medical and many other sciences. Whether you're seeking to strengthen your skills or enter the field for the first time, Radio Frequency and Microwave Electronics Illustrated is the fastest way to master every key measurement, electronic, and design principle you need to be effective. Dr. Matthew Radmanesh uses easy mathematics and a highly graphical approach with scores of examples to bring about a total comprehension of the subject. Along the way, he clearly introduces everything from wave propagation to impedance matching in transmission line circuits, microwave linear amplifiers to hard-core nonlinear active circuit design in Microwave Integrated Circuits (MICs). Coverage includes: A scientific framework for learning RF and microwaves easily and effectively Fundamental RF and microwave concepts and their applications The characterization of two-port networks at RF and microwaves using S-parameters Use of the Smith Chart to simplify analysis of complex design problems Key design considerations for microwave amplifiers: stability, gain, and noise Workable considerations in the design of practical active circuits: amplifiers, oscillators, frequency converters, control circuits RF and Microwave Integrated Circuits (MICs) Novel use of "live math" in circuit analysis and design Dr. Radmanesh has drawn upon his many years of practical experience in the microwave industry and educational arena to introduce an exceptionally wide range of practical concepts and design methodology and techniques in the most comprehensible fashion. Applications include small-signal, narrow-band, low noise, broadband and multistage transistor amplifiers; large signal/high power amplifiers; microwave transistor oscillators, negative-resistance circuits, microwave mixers, rectifiers and detectors, switches, phase shifters and attenuators. The book is intended to provide a workable knowledge and intuitive understanding of RF and microwave electronic circuit design. Radio Frequency and Microwave Electronics Illustrated includes a comprehensive glossary, plus appendices covering key symbols, physical constants, mathematical identities/formulas, classical laws of electricity and magnetism, Computer-Aided-Design (CAD) examples and more. About the Web Site The accompanying web site has

an "E-Book" containing actual design examples and methodology from the text, in Microsoft Excel environment, where files can easily be manipulated with fresh data for a new design.

Microwave Circuit Design - Kyung-Whan Yeom 2015-05-15

This is the eBook of the printed book and may not include any media, website access codes, or print supplements that may come packaged with the bound book. Today's Up-to-Date, Step-by-Step Guide to Designing Active Microwave Circuits Microwave Circuit Design is a complete guide to modern circuit design, including simulation tutorials that demonstrate Keysight Technologies' Advanced Design System (ADS), one of today's most widely used electronic design automation packages. And the software-based circuit design techniques that Yeom presents can be easily adapted for any modern tool or environment. Throughout, author Kyung-Whan Yeom uses the physical interpretation of basic concepts and concrete examples—not exhaustive calculations—to clearly and concisely explain the essential theory required to design microwave circuits, including passive and active device concepts, transmission line theory, and the basics of high-frequency measurement. To bridge the gap between theory and practice, Yeom presents real-world, hands-on examples focused on key elements of modern communication systems, radars, and other microwave transmitters and receivers. Practical coverage includes Up-to-date microwave simulation design examples based on ADS and easily adaptable to any simulator Detailed, step-by-step derivations of key design parameters related to procedures, devices, and performance Relevant, hands-on problem sets in every chapter Clear discussions of microwave IC categorization and roles; passive device impedances and equivalent circuits; coaxial and microstrip transmission lines; active devices (FET, BJT, DC Bias); and impedance matching A complete, step-by-step introduction to circuit simulation using the ADS toolset and window framework Low noise amplifier (LNA) design: gains, stability, conjugate matching, and noise circles Power amplifier (PA) design: optimum load impedances, classification, linearity, and composite PAs Microwave oscillator design: oscillation conditions, phase noise, basic circuits, and dielectric resonators Phase lock loops (PLL) design: configuration, operation, components, and loop filters Mixer design: specifications, Schottky diodes, qualitative analysis of mixers (SEM, SBM, DBM), and quantitative analysis of single-ended mixer (SEM) Microwave Circuit Design brings together all the practical skills graduate students and professionals need to successfully design today's active microwave circuits.

Design of Microwave Active Devices - Jean-Luc Gautier 2014-04-16

This book presents methods for the design of the main microwave active devices. The first chapter focuses on amplifiers working in the linear mode. The authors present the problems surrounding narrowband and wideband impedance matching, stability, polarization and the noise factor, as well as specific topologies such as the distributed amplifier and the differential amplifier. Chapter 2 concerns the power amplifier operation. Specific aspects on efficiency, impedance matching and class of operation are presented, as well as the main methods of linearization and efficiency improvement. Frequency transposition is the subject of Chapter 3. The author presents the operating principle as well as the different topologies using transistors and diodes. Chapter 4 is dedicated to the operation of fixed frequency and tunable oscillators such as the voltage controlled oscillator (VCO) and the yttrium iron garnet (YIG). The final chapter presents the main control functions, i.e. attenuators, phase shifters and switches.

High Frequency Circuit Design - Ali Behagi 2018-03-20

Unlike the many traditional textbooks written mainly for the classroom teaching, the High Frequency Circuit Design book can be taught in a classroom or in a computer lab where students can use a very low-cost or no-cost software in solving the many examples in the book. For example, the High Frequency Circuit Design book shows how to use the MATLAB Scripting in solving all the impedance matching examples in the book. This book introduces not only a solid understanding of the RF and microwave concepts and components but more importantly it shows how to use the software tools in the analysis and synthesis of these essential components in a design flow as practiced in industry. A brief organization of the book is as follows: In chapter 1, a thorough analysis of RF and microwave concepts and components are presented. In chapter 2, propagation of the plane waves in different media is introduced. Popular types of transmission lines such as coaxial, microstrip, stripline, and waveguides are defined and their parameters and performances are discussed. Microstrip bias feed and directional couplers are designed. In Chapter 3, derivation of RF and microwave network parameters, development and use of the network S parameters, and the movement of the lumped and distributed elements on the Smith chart are presented. In Chapter 4, the subject of resonant circuits and filters are thoroughly discussed and several resonators and filters are designed. In Chapter 5, the conditions for maximum power transfer and the equations for matching any two impedances are derived. Both analytical and graphical techniques are used to design narrowband and broadband impedance matching networks. In Chapter 6, analytic design equations for quarter-wave transformer and single-stub matching networks are derived. Narrowband and broadband distributed matching networks are designed. In Chapter 7, single-stage amplifiers are designed by utilizing two different impedance matching objectives. The first amplifier is designed for maximum gain where the input and the output are conjugately matched, the second amplifier is a low noise amplifier where the transistor is selectively mismatched to achieve a specific Noise Figure.

Microwave and Millimeter Wave Circuits and Systems - Apostolos Georgiadis 2012-09-17

Microwave and Millimeter Wave Circuits and Systems: Emerging Design, Technologies and Applications provides a wide spectrum of current trends in the design of microwave and millimeter circuits and systems. In addition, the book identifies the state-of-the-art challenges in microwave and millimeter wave circuits systems design such as behavioral modeling of circuit components, software radio and digitally enhanced front-ends, new and promising technologies such as substrate-integrated-waveguide (SIW) and wearable electronic systems, and emerging applications such as tracking of moving targets using ultra-wideband radar, and new generation satellite navigation systems. Each chapter treats a selected problem and challenge within the field of Microwave and Millimeter wave circuits, and contains case studies and examples where appropriate. Key Features: Discusses modeling and design strategies for new appealing applications in the domain of microwave and millimeter wave circuits and systems Written by experts active in the Microwave and Millimeter Wave frequency range (industry and academia) Addresses modeling/design/applications both from the circuit as from the system perspective Covers the latest innovations in the respective fields Each chapter treats a selected problem and challenge within the field of Microwave and Millimeter wave circuits, and contains case studies and examples where appropriate This book serves as an excellent reference for engineers, researchers, research project managers and engineers working in R&D, professors, and post-graduates studying related courses. It will also be of interest to professionals working in product development

and PhD students.

Microwave Active Devices and Circuits for Communication - Subhash Chandra Bera
2018-12-11

The book discusses active devices and circuits for microwave communications. It begins with the basics of device physics and then explores the design of microwave communication systems including analysis and the implementation of different circuits. In addition to classic topics in microwave active devices, such as p-i-n diodes, Schottky diodes, step recovery diodes, BJT, HBT, MESFET, HFET, and various microwave circuits like switch, phase shifter, attenuator, detector, amplifier, multiplier and mixer, the book also covers modern areas such as Class-F power amplifiers, direct frequency modulators, linearizers, and equalizers. Most of the examples are based on practical devices available in commercial markets and the circuits presented are operational. The book uses analytical methods to derive values of circuit components without the need for any circuit design tools, in order to explain the theory of the circuits. All the given analytical expressions are also cross verified using commercially available microwave circuit design tools, and each chapter includes relevant diagrams and solved problems. It is intended for scholars in the field of electronics and communication engineering.

Radar RF Circuit Design - Nickolas Kingsley 2016-03-01

This authoritative new resource presents practical techniques for optimizing RF and microwave circuits for applications in radar systems design with an emphasis on current and emerging technologies. Professionals learn how to design RF components for radar systems and how to choose appropriate materials and packaging methods. This book explains how to integrate components while avoiding higher-level assembly issues and troubleshooting problems on the measurement bench. Theory and practical information are provided while addressing topics ranging from heat removal to digital circuit integration. This book is divided into three sections: the first section introduces the basics of microwave design, including transmission line theory and common materials used in RF circuits. The methods for creating accurate device models for both passive and active circuits are presented. The second part details the design of power amplifiers, low noise amplifiers, and passive elements. Both conventional and state-of-the-art design techniques are included with ample 'tips and tricks.' The last section concludes with a focus on component integration providing details on design methods for military operations, high manufacturing yield, and preventing measurement issues.

Neural Networks for RF and Microwave Design - Q. J. Zhang 2000

Discover the new, unconventional alternatives for conquering RF and microwave design and modeling problems using neural networks -- information processing systems that can learn, generalize, and even allow model development when component formulas are missing -- with this book and software package. It shows you the ease of creating models with neural networks, and how quick model evaluation can be done, plus other opportunities presented by neural networks for conquering the toughest RF and microwave CAD problems.

Microwave Circuit Design Using Linear and Nonlinear Techniques - George D. Vendelin 2005-10-03

The ultimate handbook on microwave circuit design with CAD. Full of tips and insights from seasoned industry veterans, Microwave Circuit Design offers practical, proven advice on improving the design quality of microwave passive and active circuits-while cutting costs and time. Covering all levels of microwave circuit design from the elementary to the very advanced, the book systematically presents computer-aided methods for linear and nonlinear designs used in the

design and manufacture of microwave amplifiers, oscillators, and mixers. Using the newest CAD tools, the book shows how to design transistor and diode circuits, and also details CAD's usefulness in microwave integrated circuit (MIC) and monolithic microwave integrated circuit (MMIC) technology. Applications of nonlinear SPICE programs, now available for microwave CAD, are described. State-of-the-art coverage includes microwave transistors (HEMTs, MODFETs, MESFETs, HBTs, and more), high-power amplifier design, oscillator design including feedback topologies, phase noise and examples, and more. The techniques presented are illustrated with several MMIC designs, including a wideband amplifier, a low-noise amplifier, and an MMIC mixer. This unique, one-stop handbook also features a major case study of an actual anticollision radar transceiver, which is compared in detail against CAD predictions; examples of actual circuit designs with photographs of completed circuits; and tables of design formulae.

Network Scattering Parameters - Rafie Mavaddat 1996

Network scattering parameters are powerful tools for the analysis and design of high frequency and microwave networks. A comprehensive review of network scattering parameters is given with detailed discussion of their application in the analysis of stability, input and output reflection coefficients, power gains and other network parameters. Generalised scattering parameters are introduced in later chapters. The aim of this book is to give a thorough working knowledge of scattering parameters and their application in circuit analysis and design. To this end numerous illustrative examples are given in each chapter. The book should prove to be a useful companion to practicing engineers, as well as, to students and teachers in the field of HF, microwaves and optics.

Radio-Frequency Integrated-Circuit Engineering - Cam Nguyen 2015-03-03

Radio-Frequency Integrated-Circuit Engineering addresses the theory, analysis and design of passive and active RFIC's using Si-based CMOS and Bi-CMOS technologies, and other non-silicon based technologies. The materials covered are self-contained and presented in such detail that allows readers with only undergraduate electrical engineering knowledge in EM, RF, and circuits to understand and design RFICs. Organized into sixteen chapters, blending analog and microwave engineering, Radio-Frequency Integrated-Circuit Engineering emphasizes the microwave engineering approach for RFICs. • Provides essential knowledge in EM and microwave engineering, passive and active RFICs, RFIC analysis and design techniques, and RF systems vital for RFIC students and engineers • Blends analog and microwave engineering approaches for RFIC design at high frequencies • Includes problems at the end of each chapter

Microwave Circuit Design Using Linear and Nonlinear Techniques - George D. Vendelin 2021-04-27

Four leaders in the field of microwave circuit design share their newest insights into the latest aspects of the technology The third edition of Microwave Circuit Design Using Linear and Nonlinear Techniques delivers an insightful and complete analysis of microwave circuit design, from their intrinsic and circuit properties to circuit design techniques for maximizing performance in communication and radar systems. This new edition retains what remains relevant from previous editions of this celebrated book and adds brand-new content on CMOS technology, GaN, SiC, frequency range, and feedback power amplifiers in the millimeter range region. The third edition contains over 200 pages of new material. The distinguished engineers, academics, and authors emphasize the commercial applications in telecommunications and cover all aspects of transistor technology. Software tools for design and microwave circuits are included as an accompaniment to the book. In

addition to information about small and large-signal amplifier design and power amplifier design, readers will benefit from the book's treatment of a wide variety of topics, like: An in-depth discussion of the foundations of RF and microwave systems, including Maxwell's equations, applications of the technology, analog and digital requirements, and elementary definitions A treatment of lumped and distributed elements, including a discussion of the parasitic effects on lumped elements Descriptions of active devices, including diodes, microwave transistors, heterojunction bipolar transistors, and microwave FET Two-port networks, including S-Parameters from SPICE analysis and the derivation of transducer power gain Perfect for microwave integrated circuit designers, the third edition of Microwave Circuit Design Using Linear and Nonlinear Techniques also has a place on the bookshelves of electrical engineering researchers and graduate students. It's comprehensive take on all aspects of transistors by world-renowned experts in the field places this book at the vanguard of microwave circuit design research.

Radio-Frequency and Microwave Communication Circuits - Devendra K. Misra
2012-04-12

The products that drive the wireless communication industry, such as cell phones and pagers, employ circuits that operate at radio and microwave frequencies. Following on from a highly successful first edition, the second edition provides readers with a detailed introduction to RF and microwave circuits. Throughout, examples from real-world devices and engineering problems are used to great effect to illustrate circuit concepts. * Takes a top-down approach, describing circuits in the overall context of communication systems. * Presents expanded coverage of waveguides and FT mixers. * Discusses new areas such as oscillators design and digital communication. *An Instructor's Manual presenting detailed solutions to all the problems in the book is available from the Wiley editorial department.

Microwave De-embedding - Giovanni Crupi 2013-11-09

This groundbreaking book is the first to give an introduction to microwave de-embedding, showing how it is the cornerstone for waveform engineering. The authors of each chapter clearly explain the theoretical concepts, providing a foundation that supports linear and non-linear measurements, modelling and circuit design. Recent developments and future trends in the field are covered throughout, including successful strategies for low-noise and power amplifier design. This book is a must-have for those wishing to understand the full potential of the microwave de-embedding concept to achieve successful results in the areas of measurements, modelling, and design at high frequencies. With this book you will learn: The theoretical background of high-frequency de-embedding for measurements, modelling, and design Details on applying the de-embedding concept to the transistor's linear, non-linear, and noise behaviour The impact of de-embedding on low-noise and power amplifier design The recent advances and future trends in the field of high-frequency de-embedding Presents the theory and practice of microwave de-embedding, from the basic principles to recent advances and future trends Written by experts in the field, all of whom are leading researchers in the area Each chapter describes theoretical background and gives experimental results and practical applications Includes forewords by Giovanni Ghione and Stephen Maas
[Handbook of Research on Recent Developments in Electrical and Mechanical Engineering](#) - Zbitou, Jamal 2019-09-27

Technological advancements continue to enhance the field of engineering and have led to progress in branches that include electrical and mechanical engineering. These technologies have allowed for more sophisticated circuits and components while also advancing renewable energy initiatives. With increased growth in these

fields, there is a need for a collection of research that details the variety of works being studied in our globalized world. The Handbook of Research on Recent Developments in Electrical and Mechanical Engineering is a pivotal reference source that discusses the latest advancements in these engineering fields.

Featuring research on topics such as materials manufacturing, microwave photons, and wireless power transfer, this book is ideally designed for graduate students, researchers, engineers, manufacturing managers, and academicians seeking coverage on the works and experiences achieved in electrical and mechanical engineering.

Nonlinear Circuit Simulation and Modeling - José Carlos Pedro 2018-06-14

Discover the nonlinear methods and tools needed to design real-world microwave circuits with this tutorial guide. Balancing theoretical background with practical tools and applications, it covers everything from the basic properties of nonlinear systems such as gain compression, intermodulation and harmonic distortion, to nonlinear circuit analysis and simulation algorithms, and state-of-the-art equivalent circuit and behavioral modeling techniques. Model formulations discussed in detail include time-domain transistor compact models and frequency-domain linear and nonlinear scattering models. Learn how to apply these tools to designing real circuits with the help of a power amplifier design example, which covers all stages from active device model extraction and the selection of bias and terminations, through to performance verification. Realistic examples, illustrative insights and clearly conveyed mathematical formalism make this an essential learning aid for both professionals working in microwave and RF engineering and graduate students looking for a hands-on guide to microwave circuit design.

Practical Microwave Circuits - Stephen A. Maas 2014-06-01

This book differentiates itself by presenting microwave and RF technology from a circuit design viewpoint, rather than a set of electromagnetic problems. The emphasis is on gaining a practical understanding of often overlooked but vital physical processes. This resource provides microwave circuit engineers with analytical techniques for understanding and designing high-frequency circuits almost entirely from a circuit point of view. Electromagnetic concepts are not avoided, but they are employed only as necessary to support circuit-theoretical ones or to describe phenomena such as radiation and surface waves in microstrip.

RF and Microwave Electromagnetism - Pierre Jarry 2014-06-03

Microwave and radio frequency (RF) elements play an important role in communication systems, and, due to the proliferation of radar, satellite and mobile wireless systems, there is a need for the study of electromagnetism. Each of the nine chapters of this book provides a complete analysis and modeling of the microwave structure used for emission or reception technology, providing students with a set of approaches that can be used for current and future RF and microwave circuit designs. The authors emphasize the practical nature of the subject by summarizing the analysis steps and giving numerous examples of problems and exercises complete with solutions, making this book theoretical, but also experimental, with over 16 microwave problems. This approach has produced a coherent and practical treatment of the subject. The book has grown out of the authors' own teaching and, as such, has a unity of methodology and style. It provides basic knowledge of microwave and RF range and is intended for microwave engineers and for advanced graduate students.

[Nonlinear Microwave Circuits](#) - Stephen A. Maas 1997

This classic text is an excellent resource and time-saver for engineers who need to tackle troublesome nonlinear components that remain in use despite recent

advances in microwave technology. **NONLINEAR MICROWAVE CIRCUITS** offers detailed, technically substantial coverage of key methods for the analysis, design, and optimization of nonlinear microwave circuits. Using minimal mathematics, it integrates in-depth, "readable" coverage of the underlying theories that guide these methods. This book is replete with valuable "how to" information on a wide range of topics.

Linear Active Circuits - William Rynone 1986

Microwave Integrated Circuits - I. Kneppo 2012-12-06

Microwave Integrated Circuits provides a comprehensive overview of analysis and design methods for integrated circuits and devices in microwave systems. Passive and active devices, and linear and non-linear circuits are covered with a final chapter detailing measurement and test techniques.

Microwave Transistor Amplifiers - Guillermo Gonzalez 1997

Appropriate for upper level undergraduate or graduate courses in microwave transistor amplifiers and oscillators. It would also be useful for short-courses in companies that design and produce these devices. A unified presentation of the analysis and design of microwave transistor amplifiers (and oscillators) -- using scattering parameters techniques.

Nonlinear Microwave and RF Circuits - Stephen A. Maas 2003

This newly and thoroughly revised edition of the 1988 Artech House classic offers you a comprehensive, up-to-date treatment of nonlinear microwave and RF circuits. It gives you a current, in-depth understanding of the theory of nonlinear circuit analysis with a focus on Volterra-series and harmonic-balance methods. You get practical guidance in designing nonlinear circuits and modeling solid-state devices for nonlinear circuit analysis by computer. Moreover, you learn how

characteristics of such models affect the analysis of these circuits.

ICCWCS 2019 - Jamal Zbitou

Today, computer science engineering and telecommunications are two important areas linked and even inseparable. This is obvious for the user who connects the modem of his computer on his mobile phone or telephone line to access, via the global data network, the information available on the servers. The both domains are evolving rapidly and the development of new architectures of systems dedicated to telecommunications and computing becomes essential. Especially, wireless transmission systems with high data rate. Two parts of these systems should be developed software and hardware. Another area that is renewable energies becomes more attractive for researchers in order to develop new conversion systems with good performances, and a good optimization of energy. For example, in wireless sensor systems, we try to develop new protocols permitting to have a good autonomy in terms of energy.

Microwave Engineering - David M. Pozar 2011-11-22

Pozar's new edition of Microwave Engineering includes more material on active circuits, noise, nonlinear effects, and wireless systems. Chapters on noise and nonlinear distortion, and active devices have been added along with the coverage of noise and more material on intermodulation distortion and related nonlinear effects. On active devices, there's more updated material on bipolar junction and field effect transistors. New and updated material on wireless communications systems, including link budget, link margin, digital modulation methods, and bit error rates is also part of the new edition. Other new material includes a section on transients on transmission lines, the theory of power waves, a discussion of higher order modes and frequency effects for microstrip line, and a discussion of how to determine unloaded.